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1999.12.08

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**PATENTSTYRET**

Styret for det industrielle rettsvern

Id

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Anordning ved et nett, spesielt for store digitale
forbedrede trådløse telekommunikasjonssystemer (DECT)

30

FULLMEKTIG:

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ARRANGEMENT IN A NETWORK, ESPECIALLY FOR LARGE DIGITAL
ENHANCED CORDLESS TELECOMMUNICATIONS (DECT) SYSTEMS.

Field of the invention

5

The present invention relates to an arrangement in a network, especially for large Digital Enhanced Cordless Telecommunications (DECT) Systems, i.e. systems with several fixed parts connected to the same local network.

10

Technical background

The problem area

In fig. 1 there is illustrated a DECT system with several Fixed Parts (FP) connected to the same local network (LNW). An FP contains all the elements in a DECT network between the local network (LNW) and the DECT air interface.

20 Each FP has an ID that is unique within the network, the Primary Access Rights Identity, PARI.

Each Radio Fixed Part (RFP, base station) has a Radio Fixed Part Number, RPN that is unique within the fixed part that it is connected to. The base stations transmit a Radio Fixed Part Identity, RFPI, on the air interface. The RFPI is a combination of the PARI, the RPN and an extension bit E, and identifies the RFP and the FP that the RFP is connected to. The RFPI is used by the Portable Parts, PPs (handsets), to determine if they have access to the network.

In addition to the RFPI, the RFP may transmit a *Secondary Access Rights Identity*, SARI, which may also be used to give the PPs access to the network.

The layout and rules for use of ARIs and RFPI is defined
5 in (1).

The structure of ARI and RFPI for private networks, class B, is shown in Figure 2. The elements are defined as follows:

10

E Extension bit. Indicates if an SARI is available or not. Not relevant for this document.

ARC Access Rights Class

Shows the type of access to a DECT network, such as
15 residential, private or public.

EIC Equipment Installer's code

This a code that is supplied by ETSI identifies the installer of the DECT system, e.g. Ericsson.

FPN Fixed Part Number

20 A 12-bit number that identifies the fixed part. The number is unique to each FP within a network.

RPN Radio Fixed Part Number

An 8-bit number that identifies the radio fixed part. The number is unique to each RFP within an FP.

25

The problem that this Invention Disclosure discusses is that of handling the different parameters such as PARI, RPN and HLI, in a network with many FPs. This applies both to the network owner, who must keep track of a number of parameters in his own network, and to the Equipment Installer (e.g. Ericsson) who must keep a data base of parameters for all the fixed parts sold.

If an FP or RFP is to be removed, or if an FP or RFP is added to the network, the FP or RFP must be assigned a PARI or an RPN. There are also other parameters that must be adapted to handle the new or removed FP or RFP, such 5 as HLI. The Equipment Installer must find a free identity (ARI) for the customer (network owner), and the customer must then assign the value to the network.

This manual administration of parameters requires 10 extensive bookkeeping and is therefore time consuming and costly.

Known solution

15 The use of DECT identities is described in detail in ETSI standards (1). ETSI does not, however, say anything about how the dealer of the system shall select and maintain the parameters.

Problems with known solutions

Administration of identities for DECT systems is time consuming and costly both for the manufacturer and the operator of the equipment. Anything that can reduce the complexity of operation is therefore desirable. 25

The problems with handling DECT identities can be separated in three areas:

1 **Manufacturer:** Assigning ARI values of the DECT 30 equipment that is sold, and maintaining a database of these with reference to whom the equipment is sold. This is especially complex if the equipment is sold via retailers.

- 2 **Network owner:** More work to install new fixed parts, because the PARIs must be known and entered into the system manually. One cannot simply connect the hardware and start using it.
- 5
- 3 **Security (Network owner):** It is desirable to have as many of the (most significant) bits in the ARI for the different FPs in a network equal, to reduce the risk of illegal access. This decides the length of the HLI, and to maintain as high a security level as possible, the value of the HLI should be small. If FPs, with a different EIC than the existing FPs in the network, are added, the HLI will be large, and illegal access to the system will be easier.
- 10
- 15

Further prior art

From US 5,077,790 (D'Amico et al.) there is known a method for registration of a portable unit, that may be used in a communication system, comprising a network controller having a database for storing portable identification numbers. However, this prior art is silent about how to extend a telecommunication system having several fixed parts, in a safe and expedient manner.

20

25

US 5,572,574 relates to a method of on-air registration of a cordless telephone handset with a base station. Consequently, also this publication is silent about how 30 to install new fixed parts in a network.

Objects of the invention

An object of the present invention is to provide an
5 arrangement whereby the problems related to known
solutions are eliminated.

Another object of the present invention is to provide an
arrangement whereby the dealer of the system can select
10 and maintain the related parameters in a far more
expedient manner.

Still another object of the present invention is to
provide an arrangement whereby a network owner can
15 install new fixed parts in a more time-saving and
appropriate manner.

Yet another object of the present invention is to provide
an arrangement whereby the network owner can maintain a
20 high and secure level in order to reduce the risk of
illegal access.

Summary of the invention

- 25 These objects are achieved in an arrangement as stated in
the preamble, which according to the present invention is
characterised by the features as stated in the
characterising clause of the enclosed patent claim 1.
- 30 In other words, according to the present invention there
is given a solution of automatically generating the
needed identities.

Further features and advantages of the present invention will appear from the following description taken in conjunction with the enclosed drawings, as well as from the further enclosed patent claims.

5

Brief disclosure of the drawings

Fig. 1 is a schematical diagram illustrating a DECT system with several fixed parts, in which system the 10 present invention can find its application.

Fig. 2 is a schematical diagram illustrating the layout of ARI and RFPI class B, private access.

15 Detailed description of embodiments

Reference is made to Fig. 1, wherein is illustrated a Digital Enhanced Cordless Telecommunications System, DECT. This system comprises several fixed parts FP connected to the same local network LNW. An FP contains all the elements in a DECT network between the local network LNW and the DECT air interface.

Each FP has an ID that is unique within the network, the 25 Primary Access Rights Identity, PARI.

Consequently, each FP connected to a LNW must have its own, unique PARI within the network.

30 The local network will manage the PARI identities such that each FP has its own unique PARI. The FP will manage the identities of the base stations, such that each base station has an RPN that is unique within the fixed part.

The local network will automatically select a new ARI when a new FP is connected. The FP will select a new base station identity when a new base station is connected.

- 5 When the first FP is connected to the network, the network must be given an SARI. The value of the SARI is given to the network operator by an Equipment installer (ref. EIC), and is entered into the network manually. The value of the SARI is unique to the network, and is distributed to all the FPs in the network, and is transmitted on all RFPS.
10

The PARI for each FP is calculated using the EIC-part of the SARI, see Figure 2. The HLI, which is common to the
15 LNW, is recalculated and distributed to all FPs in the LNW when a new FP is added or removed.

- 20 The RPN for each RFP is handled by the individual FPs, and is automatically given to the RFPS when they are connected.

Advantages

- 25 The automatic generation of parameters will reduce service and maintenance cost both for the manufacturer/distributor and the operator of cordless telecommunication systems. This creates a concept of "plug-and-play".
30 Assigning similar PARI values to all FPs in a system ensures that the value of the HLI will be small. This reduces the risk that other users will attempt (illegal) access to the network.

Broadening

May be applicable to other cordless and cellular systems.

5

Glossary and Acronyms**Glossary****Fixed Part**

10

A physical grouping that contains all the elements in the DECT network between the local network and the DECT air interface.

15 **Equipment Installer**

The organisation that is responsible for installing the DECT equipment, usually the same as the manufacturer, e.g. Ericsson.

20 **Local Network**

A telecommunication network capable of offering local telecommunication services. In this document, the term "network" is used in the same meaning as "Local Network".

25

Portable Part

A physical grouping that contains all the elements between the user and the DECT air interface. Usually the cordless telephone handset.

30

Radio fixed part

A physical sub-group of an FP that contains all the radio endpoints that are connected to

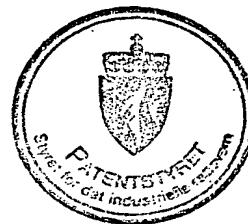
a single system of antennas
 (=radio base station)

Acronyms

	ARI	Access Rights Identity
5	DECT	Digital Enhanced Cordless Telecommunications
	EIC	Equipment Installer's Code
	FP	Fixed Part
	HLI	Handover Length Indicator
	LNW	Local Network
10	PARI	Primary Access Rights Identity
	PARK	Portable Access Rights Key
	PP	Portable Part
	RFP	Radio Fixed Part
	RPN	Radio fixed Part Number
15	SARI	Secondary Access Rights Identity

Reference documents

- (1) **ETSI300175-6 Second Edition**
- 20 Radio Equipment and systems (RES);
Digital Enhanced Cordless Telecommunications (DECT);
Common Interface (CI);
Part 6: Identities and addressing



C l a i m s

1. Arrangement in a network, especially for large Digital Enhanced Cordless Telecommunications (DECT) systems, i.e. 5 systems with several fixed parts (FP) connected to the same local network (LNW), characterised in that each fixed part (FP) is given its own unique Primary Access Rights Identity (PARI), said PARI identities being managed by the local 10 network LNW, and that each fixed part (FP) will manage the identities of associated Radio Fixed Parts/base stations (RFP) such that each base station will be given a Radio Fixed Part Number (RPN) that is unique with the Fixed Part (FP).
15
2. Arrangement as claimed in claim 1, characterised in that said local network (LNW) is further provided with means for selecting new Access Rights Identity (ARI) when a new fixed part (FP) 20 is connected.
3. Arrangement as claimed in claim 1 or 2, characterised in that said fixed part (FP) comprises means for selecting a new base station/Radio 25 Fixed Part Identity when a new base station/Radio Fixed Part is connected.
4. Arrangement as claimed in any of the preceding claims, characterised in that said network is given a Secondary Access Rights Identity (SARI), especially when a first fixed part (FP) is connected to the network.
30

5. Arrangement as claimed in claim 4,
characterised in that said SARI is given
to the network operator by an Equipment installer and is
entered into the network manually.

5

6. Method as claimed in claim 4 or 5,
characterised in that said SARI, being
unique to the network, is distributed to all the FPs in
the network and is transmitted to all RFPs.

10

7. Arrangement as claimed in any of the preceding claims,
characterised in that said PARI of each FP
is calculated by using the EIC-part of the SARI.

15

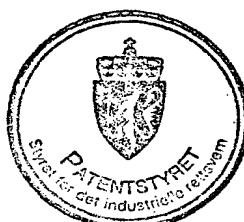
8. Arrangement as claimed in any of the preceding claims,
characterised in that the Handover Length
Indicator (HLI), which is common to the LNW, is
recalculated and distributed to all FPs in the LNW when a
new FP is added or removed.

20

9. Arrangement as claimed in any of the preceding claims,
characterised in that the RPN for each RFP
is handled by the individual FPs, and is automatically
given to RFPs when they are connected.

25

10. Arrangement as claimed in any of the preceding
claims,
characterised in that the arrangement is
implemented as a "plug-and-play" concept.

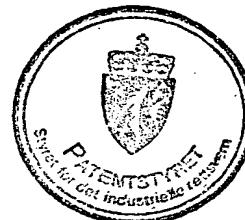


A b s t r a c t

The present invention relates to an arrangement in a network, especially for large Digital Enhanced Cordless
5 Telecommunications (DECT) Systems, i.e. systems with several fixed parts (FP) connected to the same local network (LNW), and for the purpose of providing a system that can select and maintain the parameters of such a system in a more efficient and expedient manner, it is
10 according to the invention suggested that each fixed part (FP) is given its own unique Primary Access Rights Identity (PARI), said PARI identities being managed by the local network LNW, and that each fixed part (FP) will manage the identities of associated Radio Fixed
15 Parts/base stations (RFP) such that each base station will be given a Radio Fixed Part Number (RPN) that is unique with the Fixed Part (FP).

Fig. 1

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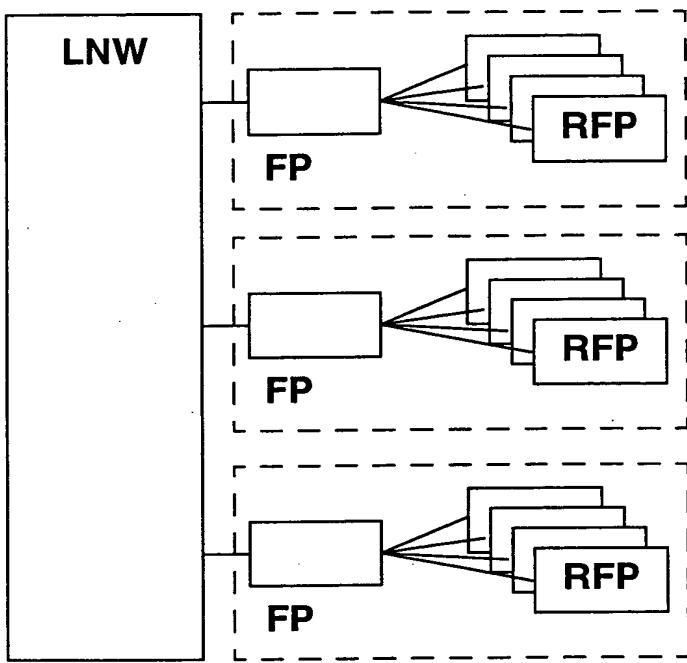


Figure 1

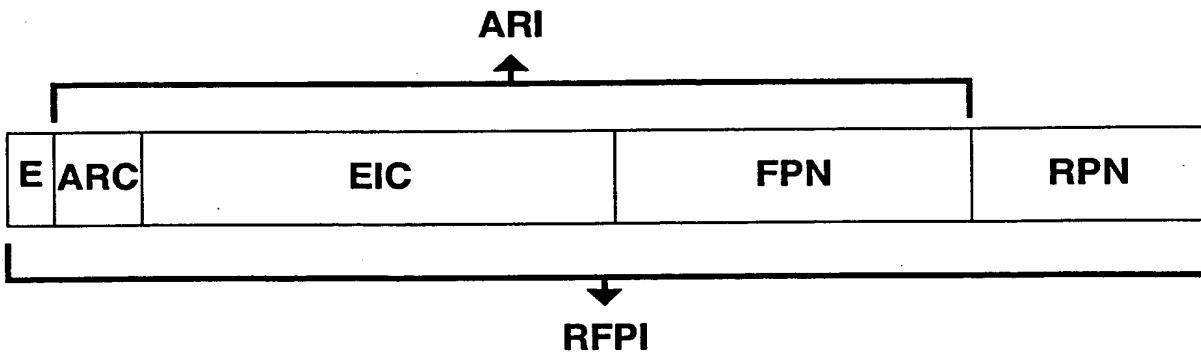
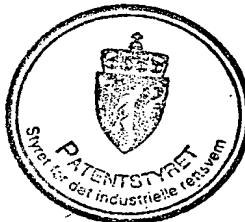


Figure 2



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